Hill Creek Bridge
Carrying Illinois Route 100
Over Hill Creek
Pearl
Pike County
Illinois

HAER No. IL-118

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Rocky Mountain Regional Office
Department of the Interior
P.O. Box 25287
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

HILL CREEK BRIDGE

HAER No. IL-118

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1. INTRODUCTION

Present Location:	Illinois Route 100 over Hill Creek Pearl, Illinois
USGS Quadrangle:	Pearl West, Illinois Latitude 39°-27.5'; Longitude 90°-37.5'
Inventory Data:	State Bond Issue Route 100 Section 120-B,C; Station 705+70 Illinois Structure No. 075-0016 SW 1/4 of Sec 10, T7S, R2W Pike County
Date of Construction:	1934, Bridge Name Plate
Owner, Custodian:	Illinois Department of Transportation
Present Use:	Vehicular bridge to be dismantled and relocated to Township Road 512 over Hill Creek on the northeast edge of Pearl.
Significance:	The Warren pony truss with verticals is unusual in Illinois and one of three identified late Warren pony trusses built after 1927.
Historian:	John B. Nolan, S.E.

II. HISTORY

The village of Pearl is located on Illinois Route 100 near the southeastern corner of Pike County. To the north, Route 100, then 106, leads toward Pittsfield, twenty miles distant, the county seat and a principal trading city. To the south, Illinois 100 parallels the Illinois river to Hardin in sparsely populated Calhoun County, a slender appendage between the Illinois and Mississippi Rivers.

Sand pushed into the area by the leading edge of the third ice age glacier provided suitable material in more recent times for Hill Creek to cut a channel through the bluffs on the west bank of the River. This gap provided a favorable location for a railroad grade and bridge over the Illinois River when the Kansas City branch of the Chicago and Alton was extended to Missouri in 1870.[1,2]

The original Pearl was settled above flood waters on the river bluff, a mile south of the present site. The village which grew at the new location by the railroad was first known as Pearl Station, and later became Pearl while the hilltop settlement became Old Pearl. The name, Pearl, recalls the extensive mussel shell industry which flourished along the Illinois River. In 1915 at the height of the boom, the population of Pearl numbered over a thousand, three button factories were in operation and eight new grocery stores opened.[2,3,4]

The railroad built facilities in Pearl and operated pusher engines to assist on the grade to Strout, six miles to the west. In the 1890 census the village had a population of 928. A long-time resident of the area remembers "going to Pearl was as big an event as going to Chicago is today".[5,6]

Pearl appeared on an Illinois 1902 bicycle route map but it was 1930 before the first hard road was extended into the area from the Illinois

River Bridge at Hardin, 22 miles to the south [7,8]. Not until the routing and paving of Illinois Route 100 to the north in 1937 was Pearl provided with a convenient access to western Illinois.

Improved roads brought the mobile life-style which has reduced the population in many small towns. Pearl's decline was hastened by a devastating flood in 1946 which destroyed twenty-five homes and damaged another fifty. In the last decades businesses and schools have closed and the privately owned ferry over the Illinois River has ceased operations. The railroad, now operated by the Southern Pacific, continues to use the line for freight service, principally between Chicago and Kansas City. The present population of Pearl is 188.

Hill Creek, channeled with an eight-foot levee on the north side, flows through the center of Pearl and swings northerly before entering the Illinois river. The bridge provides the only convenient crossing.

III. THE BRIDGE

A. The Bridge Type

The Hill Creek Bridge is a single span Pony Warren Truss with verticals. Early metal trusses were the customary and popular bridge type to use where maximum clearance above high water was needed. The bridge is skewed 55°-49' left forward, requiring an offset of two panel lengths.

The development of trusses of wrought iron and, later, steel in the second half of the nineteenth century contributed to the rapid expansion of railroads and eventually roads. For local road crossings of small streams low, or pony, Pratt trusses with pinned connections were a practical and cost effective solution. Members of early trusses could be assembled with rivets in one of the

hundreds of small fabrication shops, transported to the site by railroads and wagons and erected by a crew of local laborers under the direction of a foreman from the manufacturer's company. There were few standards and many companies developed and patented designs which allowed them to build unique, if not better, bridges.

By the turn of the century, national quality standards were emerging and many of the surviving smaller steel companies had merged into the American Bridge Company. The development of state highway departments encouraged uniformity in designs and development of experienced contractors.[9]

Lightweight pony Pratts with pinned connections and outrigger braces were easy to erect but lacked strength and lateral stability. Many were washed out or failed under the increasing weight of trucks following World War I.

The Warren Truss, basically a series of isosceles triangles, was patented in England in 1848. The design is more sophisticated than the Pratt and more economical in the use of materials. The Warrens with pinned connections had not been accepted in America but the type became a favorite after riveted joints replaced pins. Helped by the development of portable pneumatic riveters, the riveted Warren took the place of the Pratt after the first quarter of the century and since that time has been the preferred choice for spans up to 140' where a low truss bridge was required.[10,11,12]

A later improvement in truss fabrication was the use of rolled steel beams for chord members, replacing labor intensive but workable assemblies of angles, plates and lacing. The Hill Creek Bridge has rolled beams for web members and lower chords. The basic Warren truss triangles are subdivided by vertical members to reduce the unsupported lengths of upper and lower chords.

The design plans for this bridge were developed in the Bridge Section of the Division of Highways. A limited number of short trusses of this type, Standard 1642, were built in road improvement programs during the depression years. Beginning with World War II, the use of fabricated metal trusses for short spans gave way to concrete.

III. B. The Manufacturer

The bridge was fabricated by the Illinois Steel Bridge Company of Jacksonville. D. A. Chernus Construction Company of Jefferson City, Missouri, was the contractor.[13]

Founded in 1900 as the Illinois Bridge and Machine Company, the name of the corporation was changed in 1906 to the Illinois Steel Bridge Company. In 1906 the capacity of the plant was 6,000 tons a year, shop employees numbered 30 to 40, and the company employed ten salesmen doing business in Illinois, Iowa, Missouri, Arkansas, Oklahoma and the Indian Territories.[5]

Two other pony trusses in Illinois are known to have been fabricated by the Illinois Steel Bridge Company.[13]

The company was liquidated in April, 1962, and the real estate and plant equipment sold. A short time later, Commercial Steel Fabricators, Inc., was in business at the same plant site. Most of the employees in 1968 formerly worked for the Illinois Steel Bridge Company.[14] Commercial Steel Fabricators closed in the 1980s.

III. C. The Structure Description

One span, pony Warren truss with verticals.[15]
Design loading, H 15 + impact.
Allowable steel unit stress, presumed A-7, 18,000 psi.

Truss length 100'-0", five (5) panels 20'-0" long.
Skewed 55°-49', left forward, (2 panel length offset).
Total bridge length: 140'.
Distance center to center of trusses 27'-2".
Height between upper and lower chord centers 12'-6".
Clear roadway width 24'-0" between 6" curbs, 10" high.
Truss members are symmetrical about the center of the third panel.

Upper chords and half-hip end posts, L0-U0.5,
Built-up members, two 12" 25 lb. channels with 20" x 3/8" top cover plates full length, rivets spaced 3" to 5-1/4", double lacing on bottom, 2-1/2" x 3/8", and 3/8" tie plates.

Lower chords:

L0-L.75	12"x6-1/2" CB 32 lbs.
L.75-L1.75	12-1/8"x12" CB 65 lbs.
L 1.75-L2.5	12-3/8"x12-1/8" CB 79 lbs.

Diagonals:

U0.5-L1, L1-U1.5	12"x8" CB 40 lbs.
U1.5-L2, L2-U2.5	12-1/8"x6-1/2" CB 32 lbs.

Verticals:

U0.5-L0.5, U1.5-L1.5, U2.5-L2.5, one angle 3-1/2"x3-1/2"x5/16"; hangers to support lower (tension) chord between panels.

L1-U1, L2-U2 12"x8" CB 40 lbs; columns at panel points for floor beam connection and upper compression chord support.

Floor beams, rolled beams:

End, skewed	20-7/8" CB 59 lbs.
Interior @ L0, L1, L2	33" CB 125 lbs framed into verticals.
Short beam at L1	18"x7-1/2" CB 50 lbs framed to end beam.

Stringers:

Six rolled beams, 16" CB 50 lbs.

Framed into floor beams with seat and web angles, upper flange cropped, set to slope of deck crown.

Bottom lateral cross-bracing:

One angle 5"x3"x5/16" with center gusset.

5/8" dia bolt hangers from stringers next to roadway centerline.

Bearings:

Three cast iron rockers, 4-1/2" pins.

One cast iron bolster @ NE corner (obtuse), 4-1/2" pin.

Rocker plates at center of end floor beams.

Plate Gussets:

Web connections 1/2"; lower lateral connections 5/16".

Rivets:

3/4", shop and field.

Concrete Deck:

7" thick, reinforcement top and bottom,
integral 6"x10" high curbs,
3" round galvanized wrought iron drain pipes x 18".

Railing:

Channels 8" 13.75 lbs., 2'-0" deck to top;
Angle 5"x3"x5/16", 3'-1" deck to top.

Substructure:

The concrete abutments are of closed type construction, incorporating three columns to support the end bearings, a longitudinal top beam, beveled front wall, 12'-10-1/2" high, and

wingwalls. Footings are supported on untreated timber piles, driven to capacities of 10, 12 and 15 tons. The majority of reinforcement bars are square.

II. D. Present Condition and Modification

The bridge has been well maintained and is in sound condition. It is marginally adequate for present loading but the 24'-0" roadway width does not meet current minimum standards for a state highway.

No known modifications have been made to the truss.

In the early 1960's, a wall of sheet piling about 135' long, was added along the south side of Hill Creek to protect the southeast abutment corner from further erosion.

E. Ownership and Future

The Hill Creek Bridge is owned by the Illinois Department of Transportation and maintained by District Six of the Department. Due to the narrow roadway and marginal load carrying capacity, a replacement of this structure is scheduled for the immediate future.

The bridge will be dismantled and reerected for traffic use on Pearl Township Road 512 at the Hill Creek crossing, about 1000' north of the present location. The floor beams will be replaced and the truss skewed a similar amount in the opposite direction. At the new site the bridge will be useful and visible.[16]

IV. ENDNOTES

1 Conversation with Keith Donohoo, Mayor, Pearl, 18 January 1993.

2 Conversation with Jim Sanderson, Past President, Pike County Historical Society, 18 January, 17 Febrary 1993.

3 History of Pike County (Illinois) (Chicago: S. J. Clarke Publishing Co., 1906) pp 83, 109.

4 Richard Phillips, Illiniwek, (East Peoria, Illinois, January-February 1967) pp 6,7.

5 William E. Short, D.D. Early History of Illinois and Morgan County, (Chicago, Munsell Publishing Co., 1906) pp 415, 695.

6 Conversation with Mary Bauer on the reminiscences of her mother, Ethel Bauer, 25 January 1993.

7 Mendenhall's New Road Mao of Illinois. (Cincinnati, Ohio: C. S. Mendenhall, 1902).

8 Secretary of State, Automobile Department, Official Map of Illinois Highways, 1935, (Chicago, H. M. Gousha Co., 1935).

9 Victor C. Darnell, Directory of American Bridge Building Companies, 1840-1890. (Washington, D.C.: Society for Industrial Archaeology, 1984), pp Introduction, 13.

10 Milo S. Ketchum, C.E. Structural Engineers Handbook. (Chicago: McGraw-Hill, 1924), pp. 140, 676, others.

11 James L. Cooper, Iron Monuments to Distant Posterity, Indiana's Metal Bridges, 1870-1930. (DePauw University and others, 1987), pp 84ff.

12 David Plowden, Bridges: The Spans of North America. (New York: Viking Press, 1974), p 185.

13 Illinois Department of Transportation, Historic Bridge Preservation List. (Springfield, Illinois: Bureau of Location and Environment, 1992), pp 3103M.PW, 3101M.PK, 3102M.PP.

14 Morgan County, Illinois, the Twentieth Century, Sesquicentennial Edition, (Morgan County Board of Commissioners, 1968) p 215.

15 Bridge Plans, Hill Creek, S.B.I. Rt. 100, Section 120-B, Pike Co., Station 705+70. (Division of Highways, Department of Public Works and Buildings, State of Illinois, 1934) 5 sheets.

16 Conversations with Howard Timmons, Field Engineer, Illinois Department of Transportation, Springfield, Illinois, 19 January; 3, 9 February 1993.

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C. Bridge Plans

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F. Conversations

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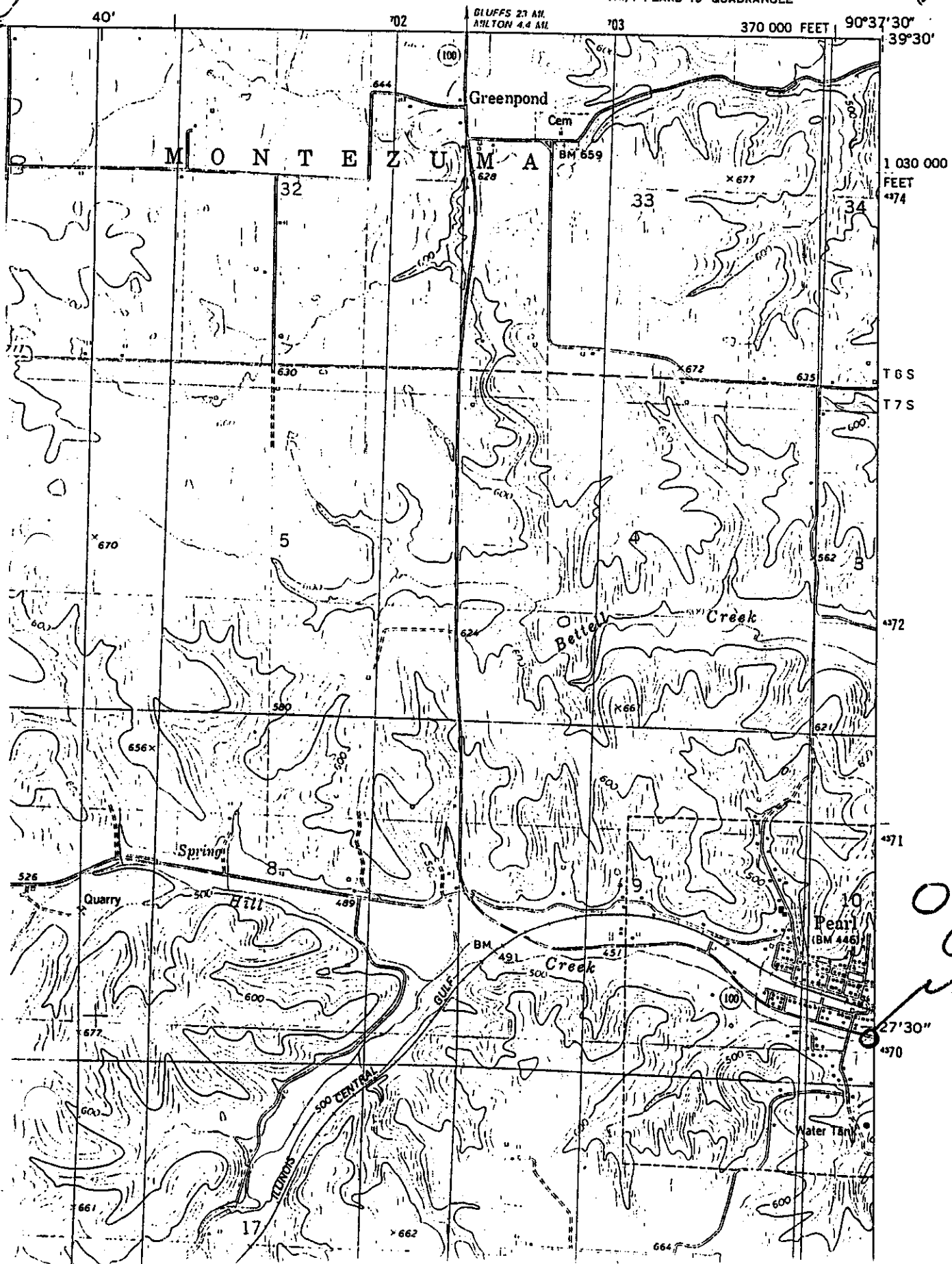
4 March 1993

PEARL WEST QUADRANGLE
ILLINOIS
7.5 MINUTE SERIES (TOPOGRAPHIC)
NW/4 PEARL 15' QUADRANGLE



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